

SKEENA NET SURVEY

Preliminary Report of Native Food
Fishing Effort on the Skeena River
In 1987

PRELIMINARY REPORT

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by

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INTRODUCTION

Salmon and steelhead of the Skeena River are subjected to commercial, native and sport fisheries as they migrate to their spawning areas. Standardized surveys are conducted to estimate fishing effort and catch in the commercial fishery (hail data; sales slips) and the sport fishery (Steelhead Harvest Analysis), but the native fishery is very poorly understood.

Fishery officers with the Federal Dept. of Fisheries and Oceans (D.F.O.) make annual estimates of the total catch of each species, but these data have been highly variable due to changes in survey methods, district boundaries and personnel. In 1985, D.F.O. funded the Gitksan Wet'suwet'en Tribal Council to estimate the effort and catch of the native fishery within their boundaries (Morrell et al 1985). Sampling was not consistent over the four year duration of the study, and data were weak during some portions of the fishery. In addition, the report did not include data for fisheries outside of the tribal boundaries, such as the Kitselaas and Kitsumkalum Bands of the lower Skeena, and the Babine Band of the upper Babine River.

A preliminary survey of the Skeena River native net fishery was conducted in 1987 to improve on existing data. The objective of the study was to estimate 1987 native fishery effort on the Skeena.

DESCRIPTION OF THE NATIVE FISHERY

The native gillnet fishery begins in the spring shortly after ice-out. Early fisheries are small and sporadic, usually targeting on overwintering steelhead (Salmo gairdneri), but increase with the appearance

of chinook salmon (Oncorhynchus tshawytscha) and sockeye salmon (O. nerka) in early July. Effort generally remains high until mid-August and the arrival of the less desirable pink salmon (O. gorbuscha), but continues through October. In 1987, D.F.O. limited net permits to three days each week between May 15 and July 3 but netting was permitted seven days per week from July 4 to Oct. 31. Although set gillnets are the predominant fishing method used by the Skeena river natives, other methods such as drift net fishing at Kitwanga and gaff fishing at Moricetown also harvest substantial numbers of fish. An escalating tidal food fishery also occurs off the mouth of the Skeena during June for 1-2 days per week. These other fisheries were not included in this survey.

METHODS

The large size of the study area and limited access precluded the use of vehicles or boats for net counts. Instead, an aerial survey was used to evaluate native net fishing effort.

The survey was stratified in both time and space. The study area was separated into three zones, of which two were on the Skeena River between the Lakelse River and Pinenut Creek while the third was on the lower Bulkley River (Fig. 1). The survey was further separated into seven strata of two weeks each, from its beginning on July 12, 1987 to completion on October 17, 1987.

Each day of the week was considered "a sampling unit", and thus each period contained 14 possible samples. The netting effort within each sampling unit was assumed to be constant (same netting effort at night as during the day). Effort was also assumed to be the same on weekdays as on weekends.

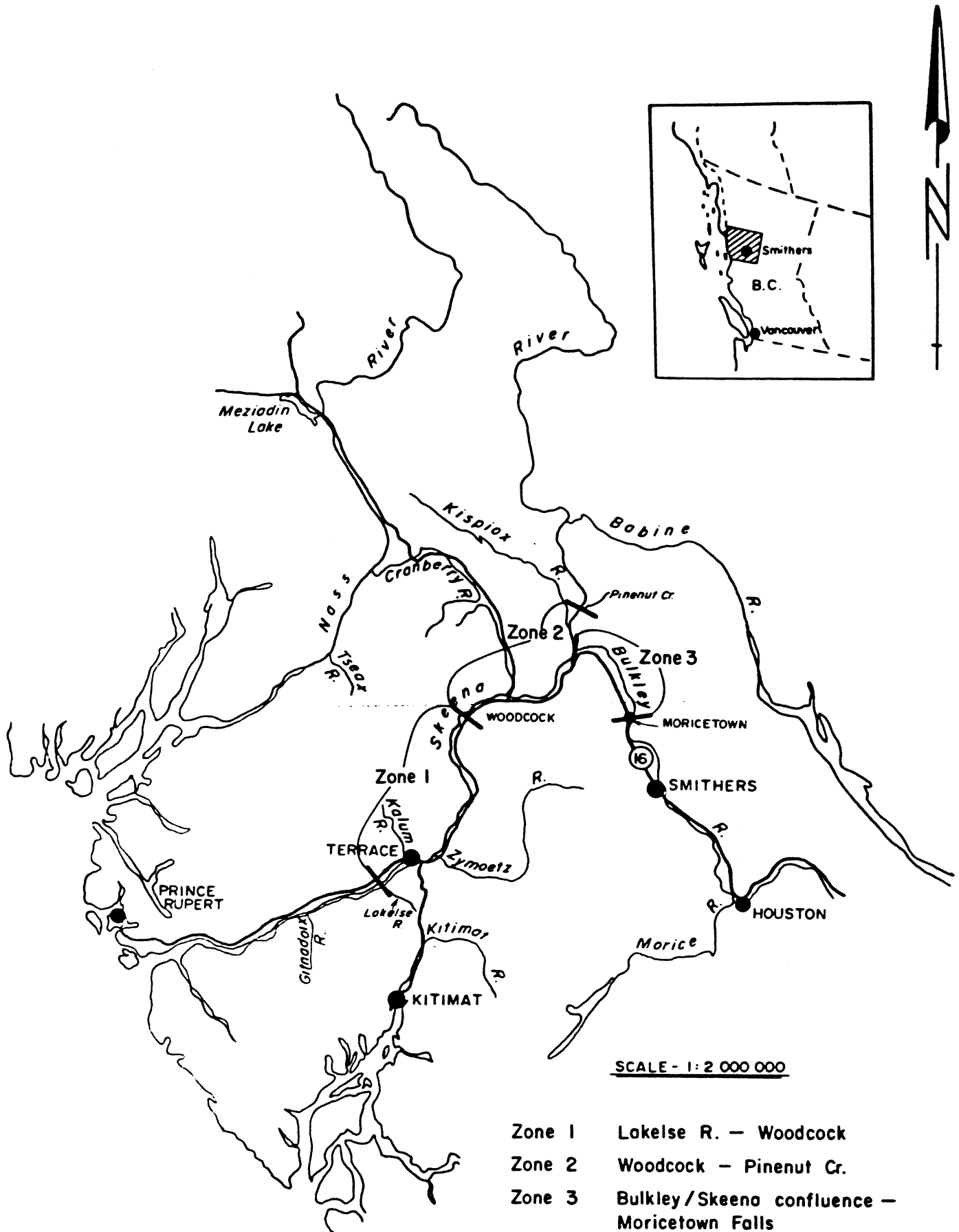


Fig. 1 Skeena River System , showing 1987 net survey zones

A total of 22 sampling flights were conducted, although all three zones were not always sampled on each flight. The zone of highest expected effort was flown more frequently than the other two zones to increase survey accuracy and efficiency. (Table 1; Appendix 1; Malvestuto et al. 1978).

Data were recorded separately for each day and zone (Appendix 2), and analyzed as follows:

$$\text{Total net days} = N_{\text{yst}} = \sum_{i=1}^L N_i Y_i$$

$$\text{Variance of } N_{\text{yst}} = V(N_{\text{yst}}) = \sum_{i=1}^L N^2 (N_i - n_i / N_i) S_i^2 n_i$$

$$\text{Confidence Limit} = \pm [0.1(n-1) S] / n \quad (\text{Sakal, 1969})$$

Where: N_i = total number of days in i^{th} stratum.

n_i = number of days sampled in i^{th} stratum.

y_i = mean net count in the i^{th} stratum.

S_i^2 = variance of Y_i .

L = number of strata.

The mean daily net count for each sample period was calculated and multiplied by the total available sampling units to determine the total netting effort for each zone and each period.

RESULTS AND DISCUSSION

1) Effort

Mean net counts and estimated total netting effort are summarized in Table 2. The area between Kitwanga and Pinenut Creek (Zone 2) received nearly 80% of the total netting pressure during the 14 week survey. This zone also accounted for the majority of effort in each of the seven sample periods.

TABLE 1. Number of days sampled in each zone during the seven sample periods of the Skeena Net Survey, 1987.

Sample Period	Number of Days Sampled		
	Zone 1	Zone 2	Zone 3
1. Jul 12 - 25	3	3	3
2. Jul 26 - Aug 8	5	5	4
3. Aug 9 - 22	2	5	3
4. Aug 23 - Sep 5	2	4	2
5. Sep 6 - 19	3	3	2
6. Sep 20 - Oct 3	0	0	0
7. Oct 4 - 17	0	2	2
All	15	22	16

TABLE 2. Mean net count per sample and estimated total net days in each zone during the seven sample periods of the 1987 Skeena Net Survey, (standard deviation of mean in brackets.)

Sample Period	Zone 1			Zone 2			Zone 3			Eat Tot Net Days All Zones
	Mean Nets/Day	S.D.	Eat Tot Net Days	Mean Nets/Day	Eat Tot Net Days	Mean Nets/Day	S.D.	Eat Tot Net Days		
1. Jul 12 - 25	3.0	(0.33)	42	16.7	(0.57) 233	3.7	(3.51)	51	326	
2. Jul 26 - Aug 8	6.2	(4.15)	87	21.2	(4.66) 297	3.0	(1.41)	42	426	
3. Aug 9 - 22	2.5	(3.53)	35	17.3	(7.73) 243	1.0	(1.0)	14	292	
4. Aug 23 - Sep 5	1.5	(0.71)	21	10.2	(6.45) 144	1.0	(1.71)	14	179	
5. Sep 6 - 19	1.0	(0.58)	14	13.0	(3.45) 182	1.3	(0.58)	19	215	
6. Sep 20 - Oct 3	N.S. ^a		N.S.	N.S.	N.S.	N.S.		N.S.	N.S.	
7. Oct 4 - 17	N.S.		N.S.	1.0	(0.71) 14	0	(0)	0	14	
All			199		1,113			140	1,452	
(99% confidence interval)			(73 - 306)		1004 - 1200)			(51 - 229)		

^a N.S. = not sampled

The most intensive netting effort occurred from July 26 - August 8. Zone 2 accounted for an estimated 297 net days during this period. Effort generally declined gradually thereafter until September 19, when virtually all netting was halted as a result of flooding conditions. Nets were not observed in the lower Skeena (Zone 1) or lower Bulkley (Zone 3) for the remainder of the survey but were present again in Zone 2 by the last sampling period. A flight undertaken after completion of the survey revealed 7 nets still present in zone 2 on October 21.

The majority of net days in Zone 1 took place in late July and early August. Declines in netting intensity after that time may have been a reflection of the D.F.O.'s appeal to reduce harvesting pressure to permit greater escapement of upper Skeena coho.

Netting effort in Zone 3 was greatest in mid July and declined rapidly by early August. Since there were no other obvious reasons for such a decrease in activity (i.e. flooding, conservation), it is possible this segment of the fishery targeted largely on chinook salmon, and that effort was a reflection of the seasonal abundance of that species in the lower Bulkley.

Logistical problems, combined with unpredictable river conditions, prevented adherence to a rigid and complete sampling schedule. A helicopter break down, as well as forest fire related helicopter conscriptions, resulted in the deletion and re-arrangement of sample dates. In addition, sampling was not undertaken from September 20 - October 3 as a result of heavy rains. The Skeena and its tributaries were in flood at that time and, as previously mentioned, netting was virtually impossible.

2) Catch

Catch statistics could not be obtained as part of the present study, despite their obvious importance. Rough estimates of catch were attempted using catch per unit effort data from Morrell et al. (1985) and from nets seized by D.F.O. fishery officers during enforcement activities, but neither of these methods provided a worthwhile assessment of the Native catch.

Extrapolations from Morrell et al. (1985) would have to be based on the assumption that run strength, water conditions and other factors governing netting success are similar from year to year. However, given the flood conditions in 1987 and highly variable run sizes, it was clear this extrapolation was unreasonable.

In the case of fishery officer data, samples of catch were only available for the first three weeks of the study a period characterized by relatively weak steelhead run strength. Furthermore, it was unclear how long most seized nets had been left in the river, thereby making any catch per unit effort data inestimable.

RECOMMENDATIONS FOR FURTHER STUDY

Further studies of the Skeena River food fishery should follow the stratified sampling procedure described by Malvestuto et al. (1978). Accordingly, surveys should be spatially and temporally stratified, with survey effort distributed in a way which reflects the distribution of fishing effort described in the present study. The overall variance of the sample would be reduced by concentrating on the times and locations of highest use.

A direct assessment of catch should also be conducted concurrently with future surveys of Native fishing effort. Obtaining this information would hinge on development of a better rapport with the Native community than presently exists. Developing such a liaison would comprise the largest part of the catch assessment task.

It is obvious that only direct evaluations of catch per unit effort will provide reasonable estimates of catch. Native fishermen are, however, unwilling to provide such information at this time. Better access to catch statistics might be developed if a sound liaison could be established with the Band Councils and fishermen.

REFERENCES

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- Morrell, M., C. Barnes and G. Harris, 1985. The Gitksan Wet'suwet'en Fisheries in the Skeena River System: 1985 Data Report. MILAP Project No. 8205 DX8.
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Appendix 1. Sample dates of each zone during Skeena Net Survey, July 12
 - October 17, 1987.

Sample	Period	Date	.of Sample	(Flight)	Zones Sampled
1	Jul	14/87			1-2-3
1	Jul	19/87			1-2-3
1	Jul	24/87			1-2-3
2	Jul	29/87			1-2-3
2	Aug	1/87			1-2-3
2	Aug	4/87			1-2-3
2	Aug	6/87			1-2-3
2	Aug	8/87			1-2
3	Aug	12/87			2-3
3	Aug	14/87			1-2
3	Aug	16/87			1-2
3	Aug	18/87			1-2
3	Aug	22/87			2-3
4	Aug	25/87			1-2
4	Aug	30/87			2-3
4	Sep	3/87			2-3
4	Sep	5/87			1-2
5	Sep	8/87			Not sampled ¹
5	Sep	9/87			1-2-3
5	Sep	13/87			Not sampled ²
5	Sep	14/87			1-2-3
5	Sep	19/87			1-2-3
6					Not sampled ³
7	Oct	5/87			2-3
7	Oct	9/87			2-3

¹ Sample aborted - helicopter failure

² Helicopter commandeered - forest fires

³ Sampling suspended - Skeena in flood

⁴ Additional flight on October 21, 1987 counted 7 nets in Zone 2 and 0 nets in Zone 3.

Appendix 2. Number of nets counted during each sample period in zones 1, 2, and 3 the Skeena Net Survey, during July 12 – October 17, 1987.

SAMPLE PERIOD

Zone	(Start Date)						
	1 (Jul 12)	2 (Jul 26)	3 (Aug 9)	4 (Aug 23)	5 (Sep 6)	6 (Sep 20)	7 (Oct 4)
1	3	1	5	1	1	N.S. ¹	N.S.
	4	3	0	2	0		
	2	9			0		
		11					
		7					
2	18	20	9	18	15	N.S.	1
	16	16	11	13	15		
	16	25	21	4	9		1
		27	21	6			
		18	28				
		14					
3	4	2	1	0	1	N.S.	N.S.
	0	2	2	1	1		
	7	3	0		2		
		5					

¹ Not sampled.